

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A process chamber cleaning method in a substrate processing apparatus configured to perform a nitriding process or oxidizing process as a predetermined process on a target substrate accommodated in a process chamber, the method comprising:

~~at least one performing a cleaning cycle [[of]]~~ a plurality of times within the process chamber that does not accommodate the target substrate, wherein the cleaning cycle alternately performing an operation of includes generating first plasma of a first mixture gas containing consisting essentially of oxygen gas and argon gas within the process chamber to clean the process chamber, and an operation of generating second plasma of a second mixture gas containing consisting essentially of nitrogen gas and argon gas within the process chamber to clean the process chamber.

Claim 2 (Currently Amended): The process chamber cleaning method according to claim 1, wherein each of the first plasma and the second plasma has an electron temperature of 2 eV or less.

Claim 3 (Currently Amended): The process chamber cleaning method according to claim 1, wherein each of the first plasma and the second plasma is generated by microwaves supplied into the process chamber through a planar antenna having a plurality of slots and disposed on the process chamber to face the target substrate.

Claims 4-11 (Canceled).

Claim 12 (Currently Amended): A substrate processing method for performing a nitriding process or oxidizing process as a predetermined process on a target substrate accommodated in a process chamber, the method comprising:

~~cleaning a process chamber by at least one~~ performing a cleaning cycle ~~[[of]]~~ a plurality of times within the process chamber that does not accommodate the target substrate, wherein the cleaning cycle alternately ~~performing an operation of~~ includes generating first plasma of a first mixture gas ~~containing~~ consisting essentially of oxygen gas and argon gas within the process chamber to clean the process chamber, and ~~an operation of~~ generating second plasma of a second mixture gas ~~containing~~ consisting essentially of nitrogen gas and argon gas within the process chamber to clean the process chamber;

~~then~~ after the performing, seasoning the process chamber that does not accommodate the target substrate by ~~at least one operation of~~ generating plasma of ~~[[a]]~~ the first mixture gas ~~containing oxygen~~ or generating plasma of ~~[[a]]~~ the second mixture gas ~~containing nitrogen~~ within the process chamber; and

~~then~~ after the seasoning, ~~installing a~~ loading the target substrate into the process chamber and performing ~~[[a]]~~ the predetermined process on the target substrate.

Claim 13 (Canceled).

Claim 14 (Currently Amended): The substrate processing method according to claim ~~[[13]]~~ 12, wherein the predetermined process performed on the target substrate is a nitriding process and the seasoning is arranged to generate plasma of ~~[[a]]~~ the second mixture gas ~~containing nitrogen where the predetermined process performed on the target substrate is a nitriding process, and the seasoning is arranged to generate plasma of a gas containing~~

~~oxygen where the predetermined process performed on the target substrate is an oxidizing process.~~

Claim 15 (Currently Amended): The substrate processing method according to claim 12, wherein each of the first plasma and the second plasma is set to have an electron temperature of 2 eV or less.

Claim 16 (Currently Amended): The substrate processing method according to claim 12, ~~wherein, in cleaning the process chamber,~~ wherein each of the first plasma and the second plasma is low electron temperature plasma ~~[[is]]~~ generated by microwaves supplied into the process chamber through a planar antenna having a plurality of slots and disposed on the process chamber to face the target substrate.

Claim 17 (Canceled).

Claim 18 (Currently Amended): The process chamber cleaning method according to claim 1, ~~wherein a last cycle for performing process chamber cleaning includes~~ wherein, after the performing the cleaning cycle a plurality of times, the method further comprises a final operation period using plasma of the oxygen-containing first mixture gas or using plasma the nitrogen-containing the second mixture gas, and the final operation period is longer than the former operations comprises a plasma generation time longer than a generation time of the first plasma or the second plasma of the cleaning cycle.

Claim 19 (Currently Amended): The process chamber cleaning method according to claim 1, wherein the cleaning cycle comprises performing vacuum-exhaust of the process

chamber ~~is performed~~ between ~~the operation of~~ the generating the first plasma ~~of the oxygen~~
~~containing gas and the operation of~~ the generating the second plasma ~~of the nitrogen~~
~~containing gas.~~

Claim 20 (Currently Amended): The process chamber cleaning method according to
claim 1, wherein the cleaning cycle comprises performing vacuum-exhaust of the process
chamber and introducing ~~an inactive~~ argon gas into the process chamber ~~are performed~~
between ~~the operation of~~ the generating the first plasma ~~of the oxygen containing gas and the~~
~~operation of~~ the generating the second plasma ~~of the nitrogen containing gas.~~

Claim 21 (New): The substrate processing method according to claim 12, wherein the
predetermined process performed on the target substrate is the oxidizing process and the
seasoning is arranged to generate plasma of the first mixture gas.

Claim 22 (New): The substrate processing method according to claim 12, wherein the
cleaning cycle and the seasoning are performed while a dummy substrate is placed on a table
for placing the target substrate, so as to protect the table.

Claim 23 (New): The substrate processing method according to claim 12, wherein the
seasoning comprises a plasma generation time longer than a generation time of the first
plasma or the second plasma of the cleaning cycle.

Claim 24 (New): The substrate processing method according to claim 12, wherein the
cleaning cycle comprises performing vacuum-exhaust of the process chamber between the
generating the first plasma and the generating the second plasma.

Claim 25 (New): The substrate processing method according to claim 12, wherein the cleaning cycle comprises performing vacuum-exhaust of the process chamber and introducing argon gas into the process chamber between the generating the first plasma and the generating the second plasma.